Technology/Company Report

September 29th, 2004




Lawrence H. Mott
Wind Technology Group
Waitsfield, Vermont

NORTHERN POWER SYSTEMS
power without limits

Northern Power Systems, Inc.

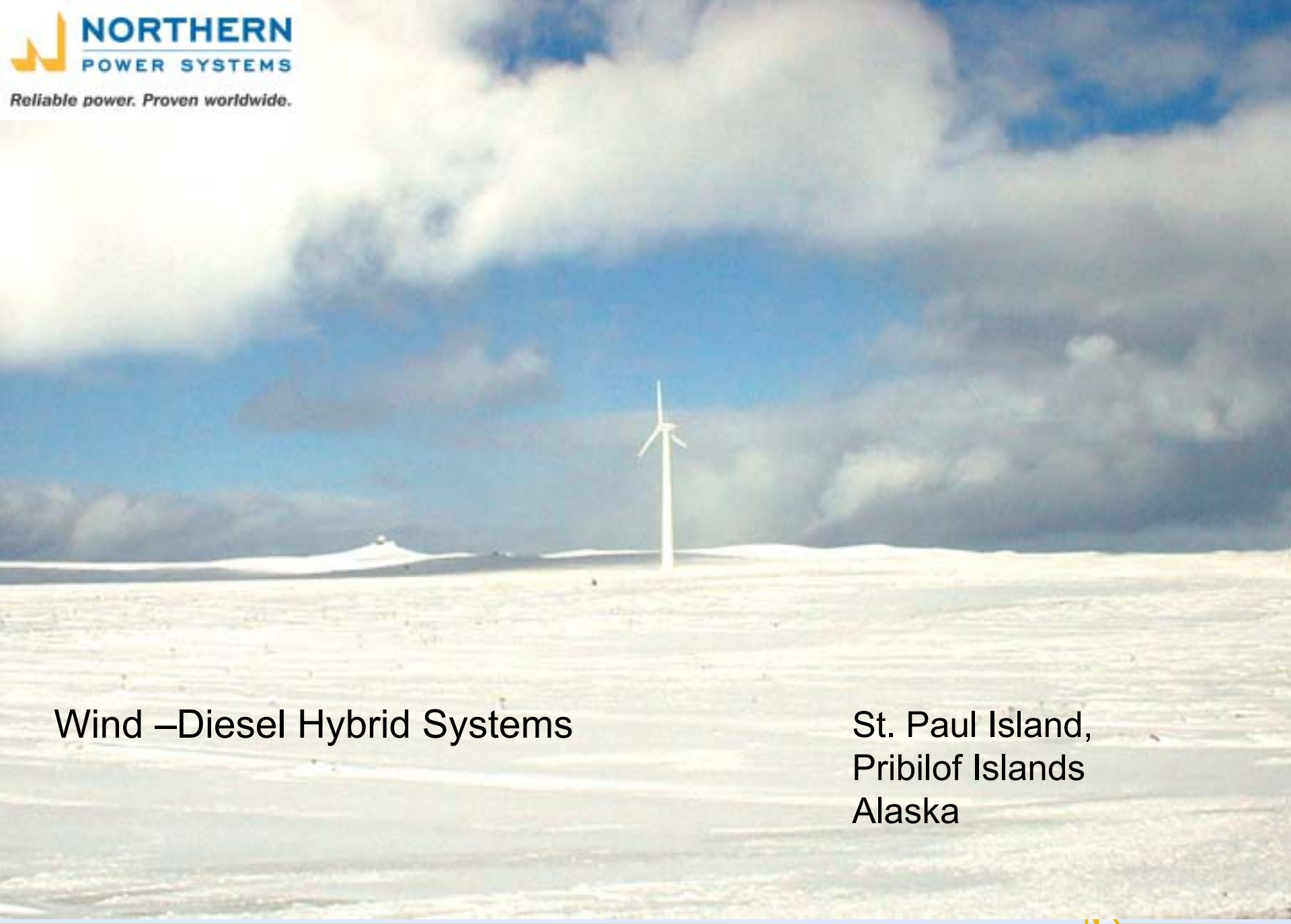
We design, build and install ultra-reliable electric power systems for industrial, commercial, and government customers worldwide.

- 30 years of experience in on-site power systems
- 800 systems installed in 45 countries on all 7 continents
- 130+ employees: over 50% with engineering degrees
- Wide range of generation technologies
- Oldest renewable system supplier in U.S.

Northern's Prime Markets

- **Commercial / institutional facilities** (office buildings, hotels, hospitals)
- **Manufacturing** (food/beverage, pharmaceutical, plastics, semiconductor)
- **Industrial infrastructure** (transportation, pipeline, telecom)
- **Remote installations** (military, geophysical, isolated community)



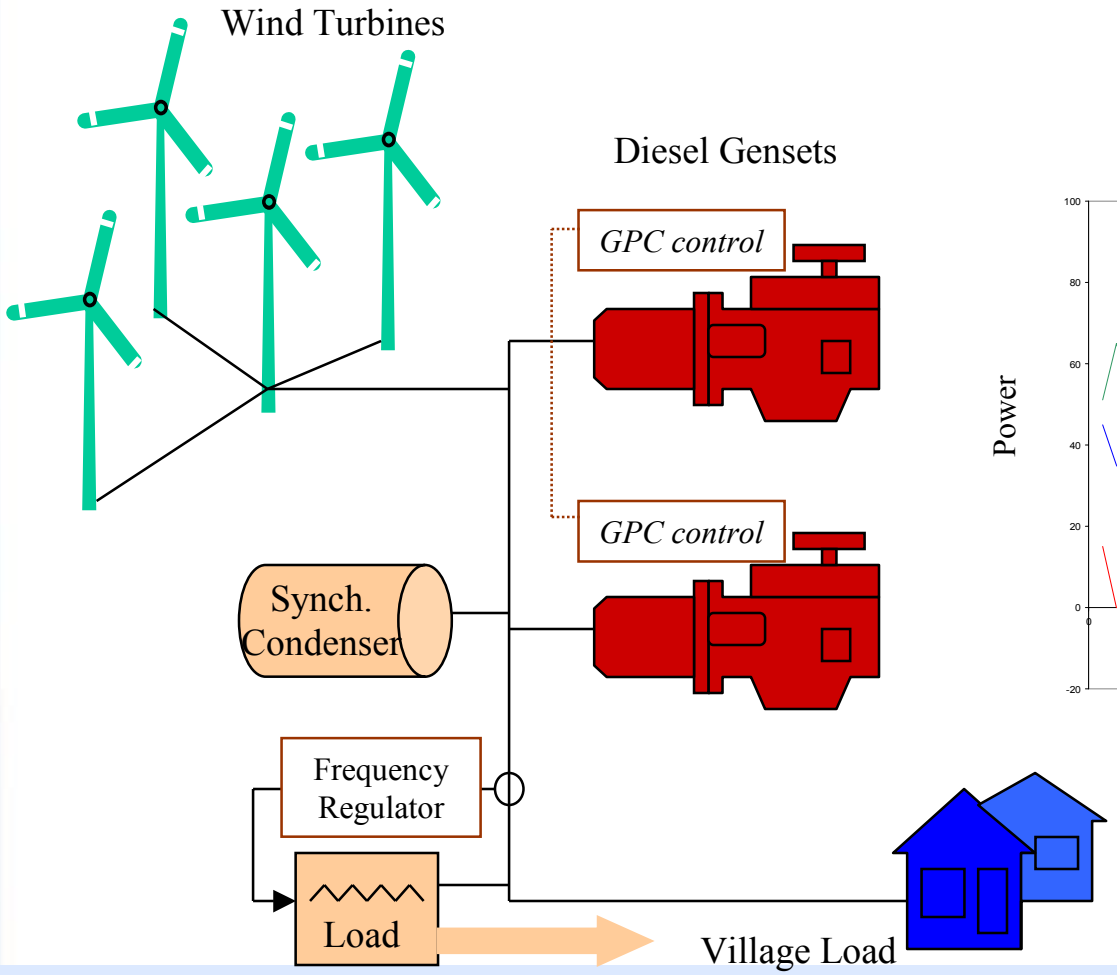



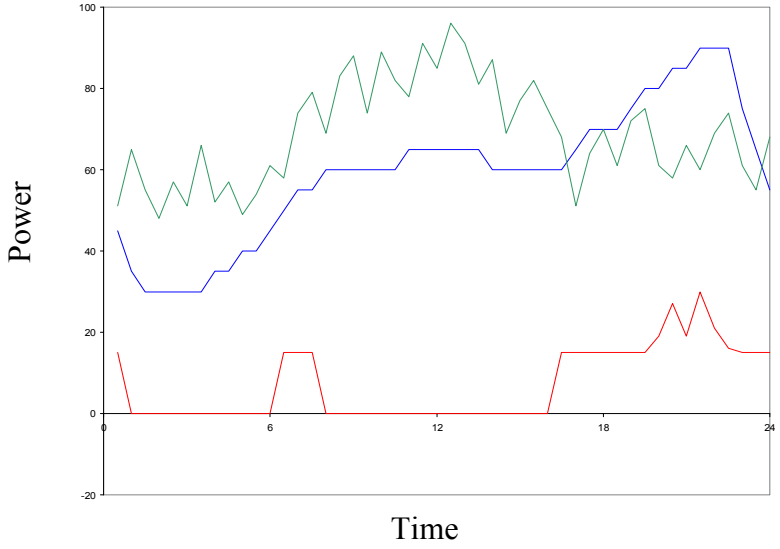
Wind –Diesel Hybrid Systems

St. Paul Island,
Pribilof Islands
Alaska

TDX Power System – St. Paul Island - 1999

High Penetration - Fully Integrated

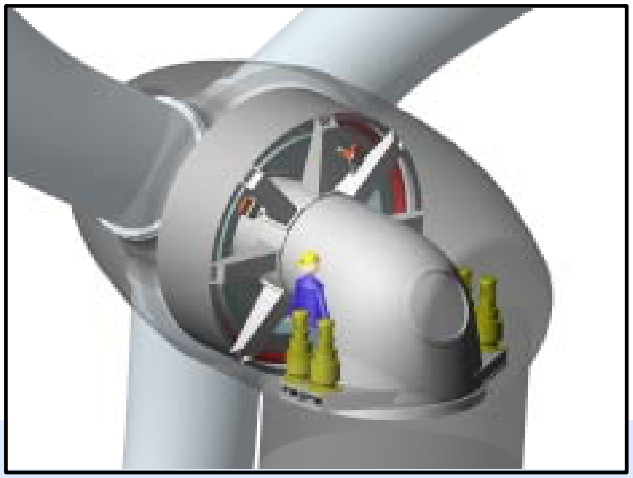




Northern's Wind Energy Focus

Dedicated Wind Energy Business Unit at Northern

- NW100 Commercial Turbine Development
- 1.5 MW Direct Drive PM Generator Development
- 2.0 MW Complete Turbine Development
- Advanced MW-Scale Power Converter Development
- EPC/Commercial Development Projects



NorthWind 100™: Wind turbine

State of the Art wind turbine technology
For Wind Diesel and Distributed Generation Applications

Kotzebue, Alaska

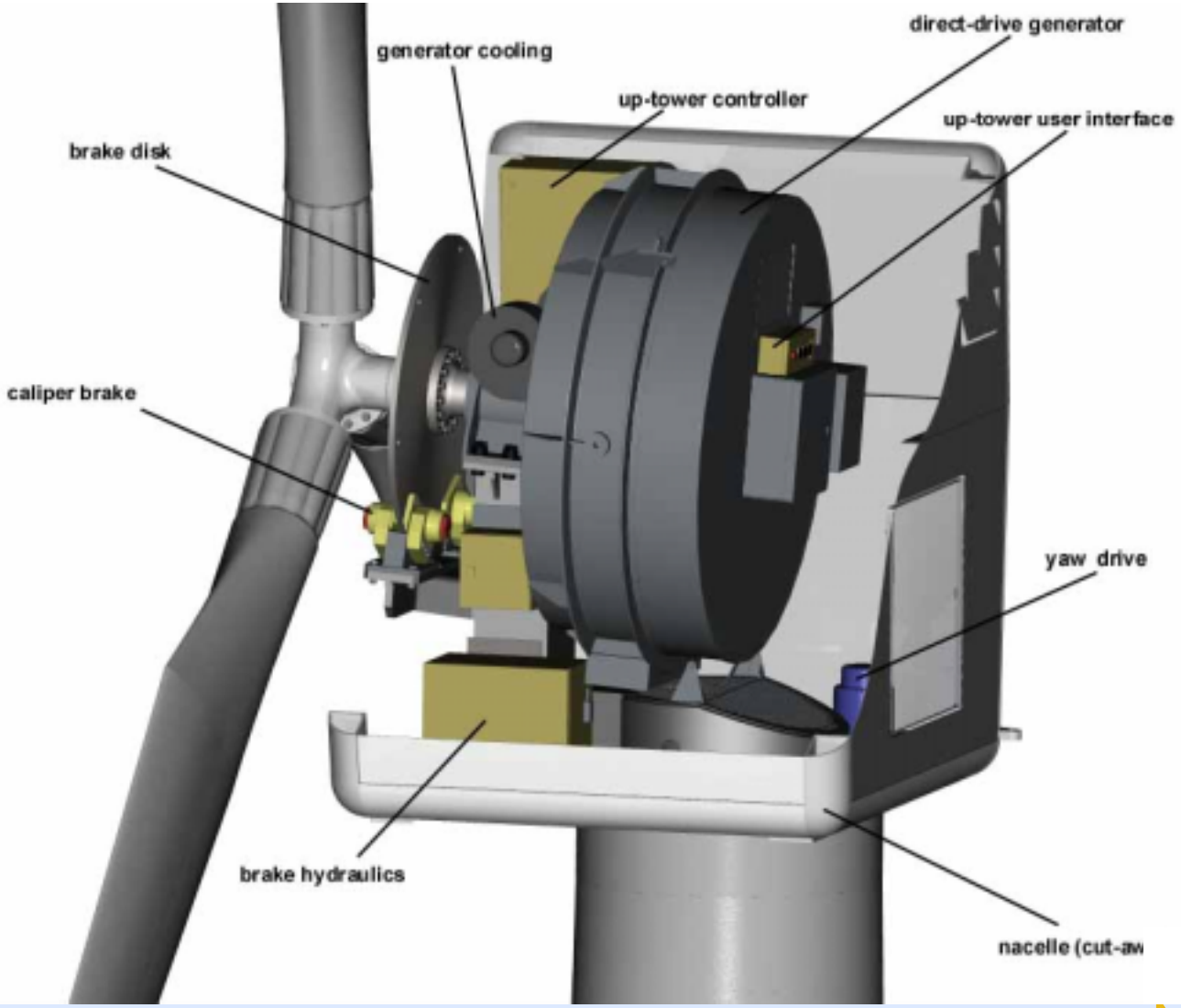
NorthWind 100™

Specifically designed for the Alaskan village

<u>Arctic Environment:</u>
Minimum temperature = -46 Deg F
Heating of certain components
Icing to 30mm; no moving blade parts
Fully enclosed nacelle & tower

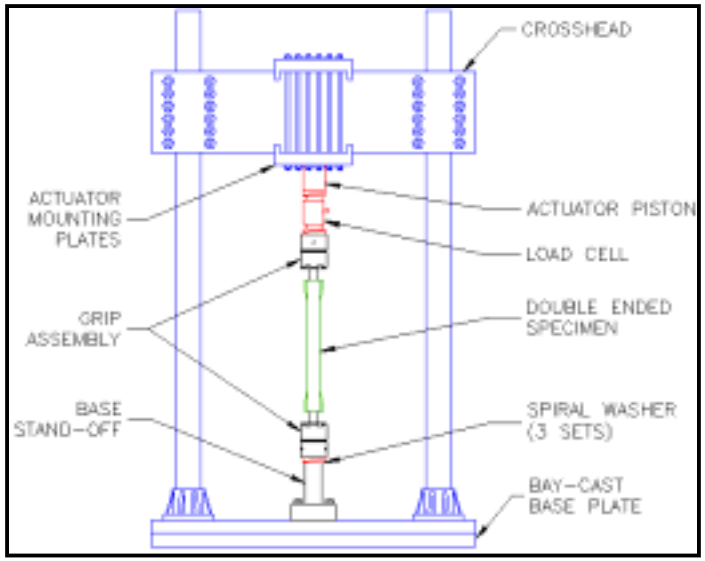
<u>Features for the Isolated Grid:</u>
>0.97 power factor
Zero reactive power consumption
Active VAR support
Power limiting

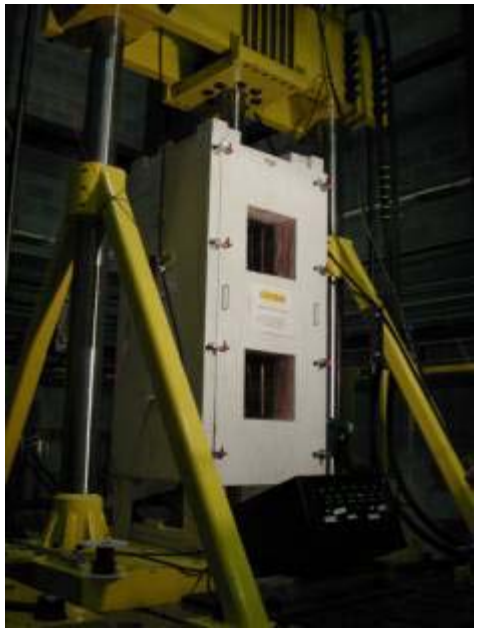
Simplicity by Design



Component Testing – Blade Root

- Determine the effect of low temperature on the strength of the root stud attachments
- Full blade extreme load and fatigue testing





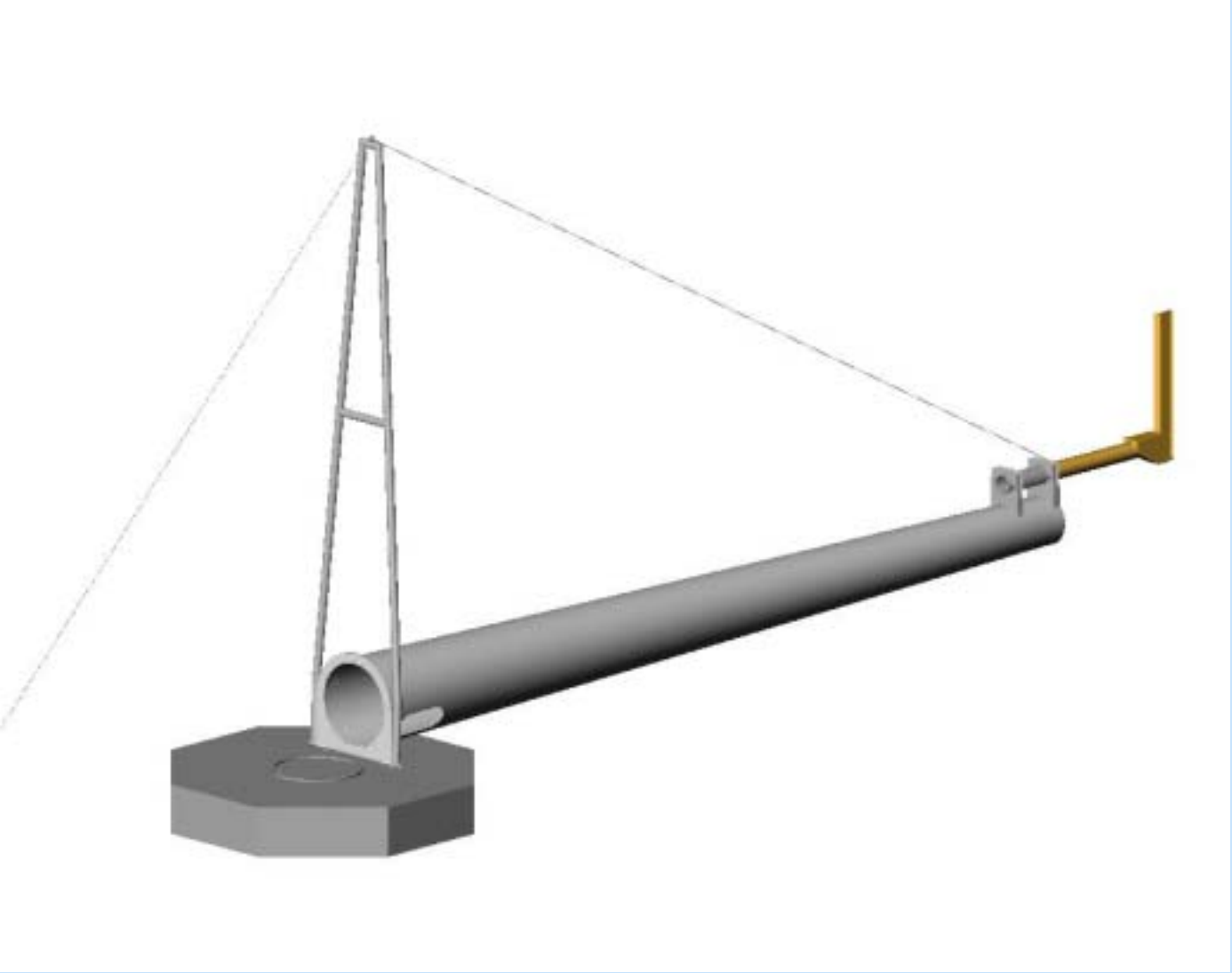
Main Result:

- No knock-down factors need be applied to the root-hub interface design to account for low temperature operation

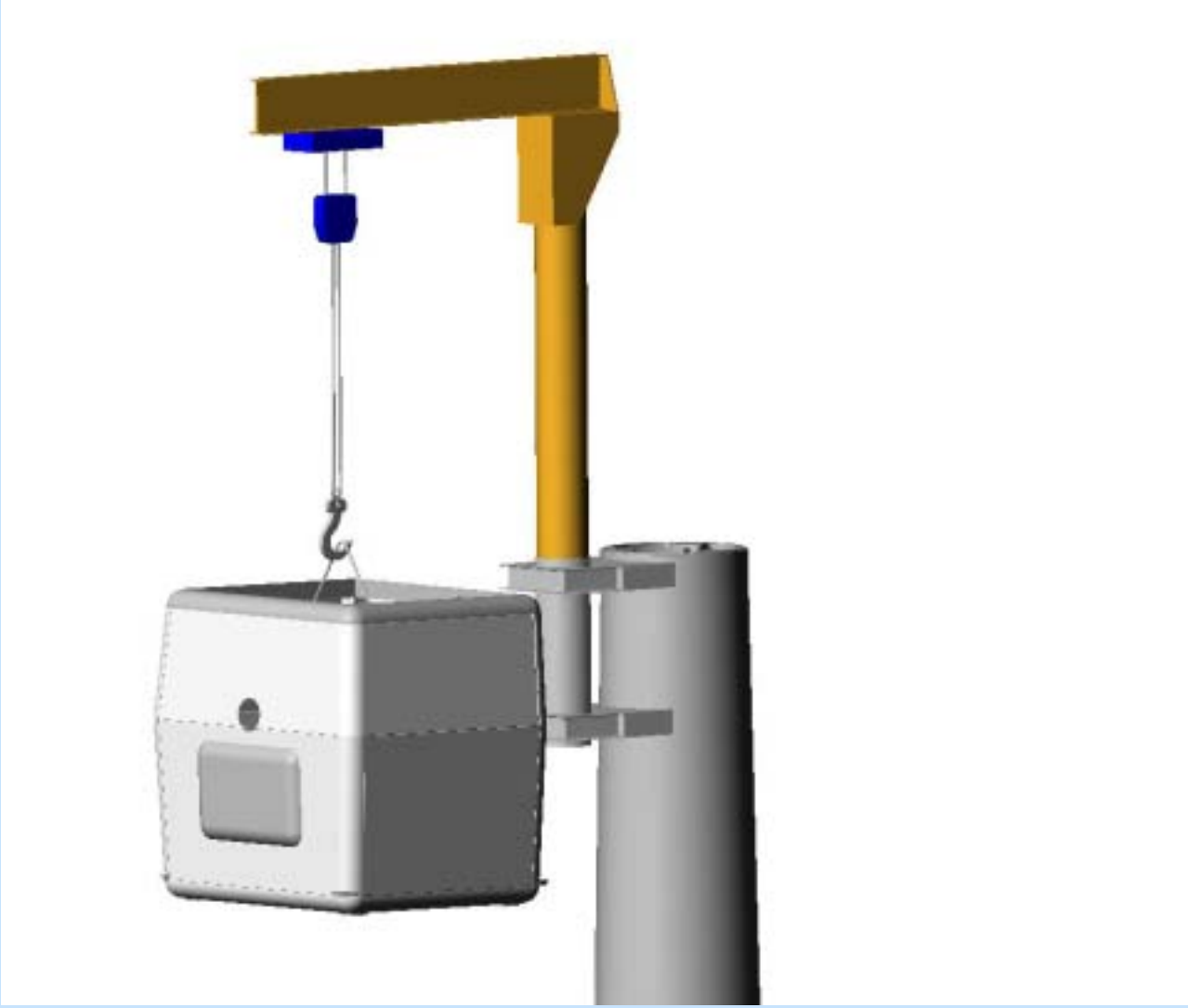
NW100 Field Experience

Proof of Concept (POC)	Instrumented Prototype	Early Production Unit
		
Rock of Ages quarry Graniteville, VT	National Wind Technology Center - Boulder, CO	Kotzebue Electric Association Kotzebue, AK

Remote Installation: Tower Tilt-Up



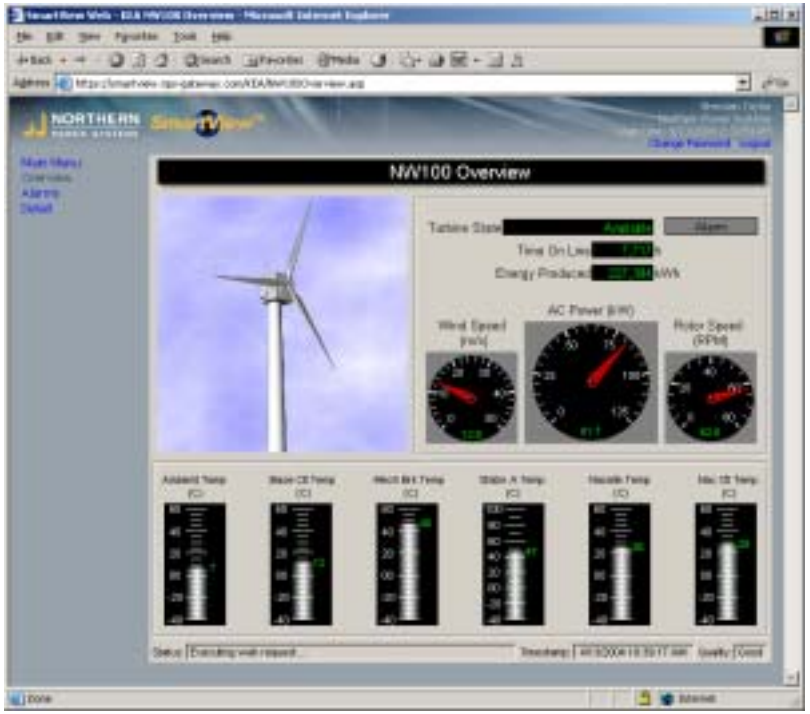
Remote Installation: Nacelle Lift



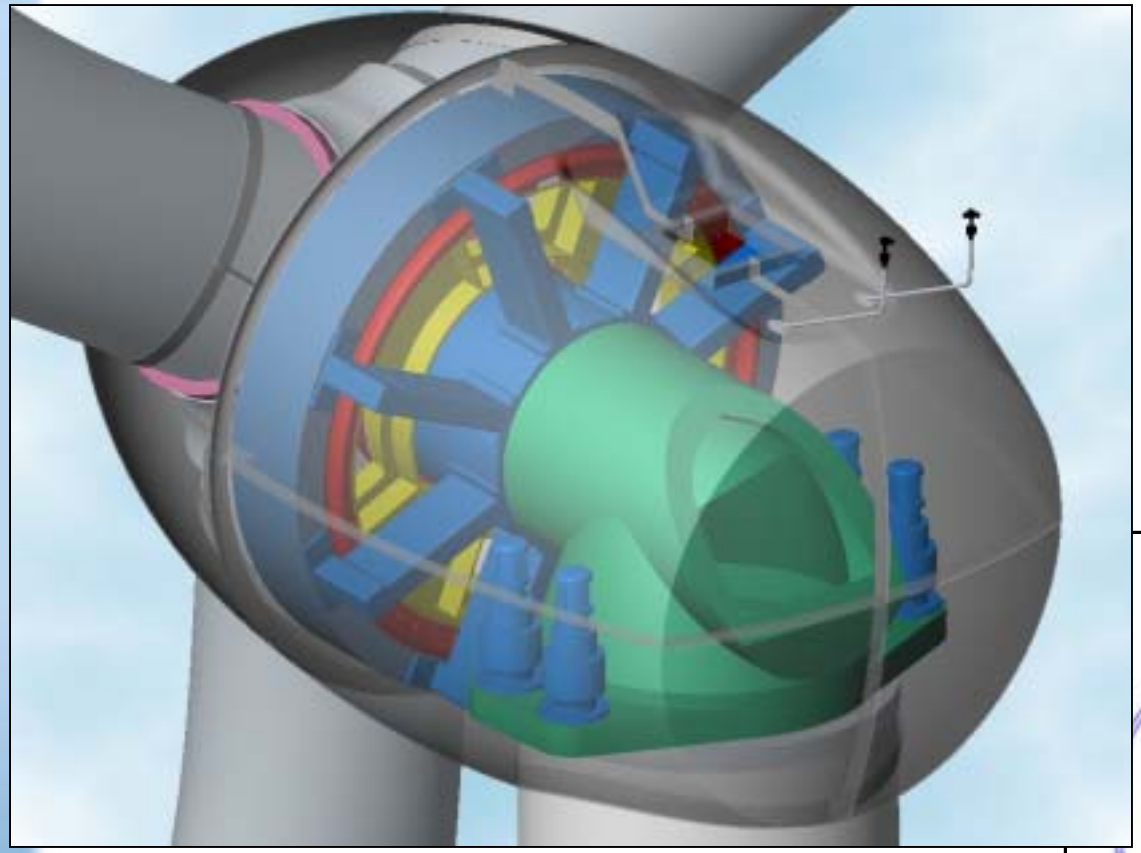
SmartView™ Technology

A system of hardware and software that provides the capability to monitor and control geographically distributed assets from anywhere in the world

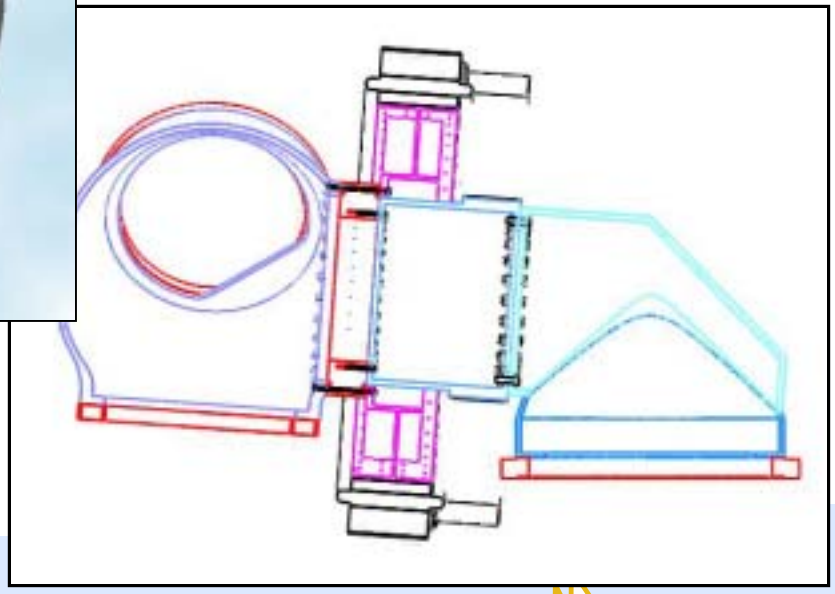
- Local or browser-based HMI
- Fleet-level monitoring
- Standards-based design
- Local and remote execution of manual control
- Automated alarm notification
- Automated data reporting

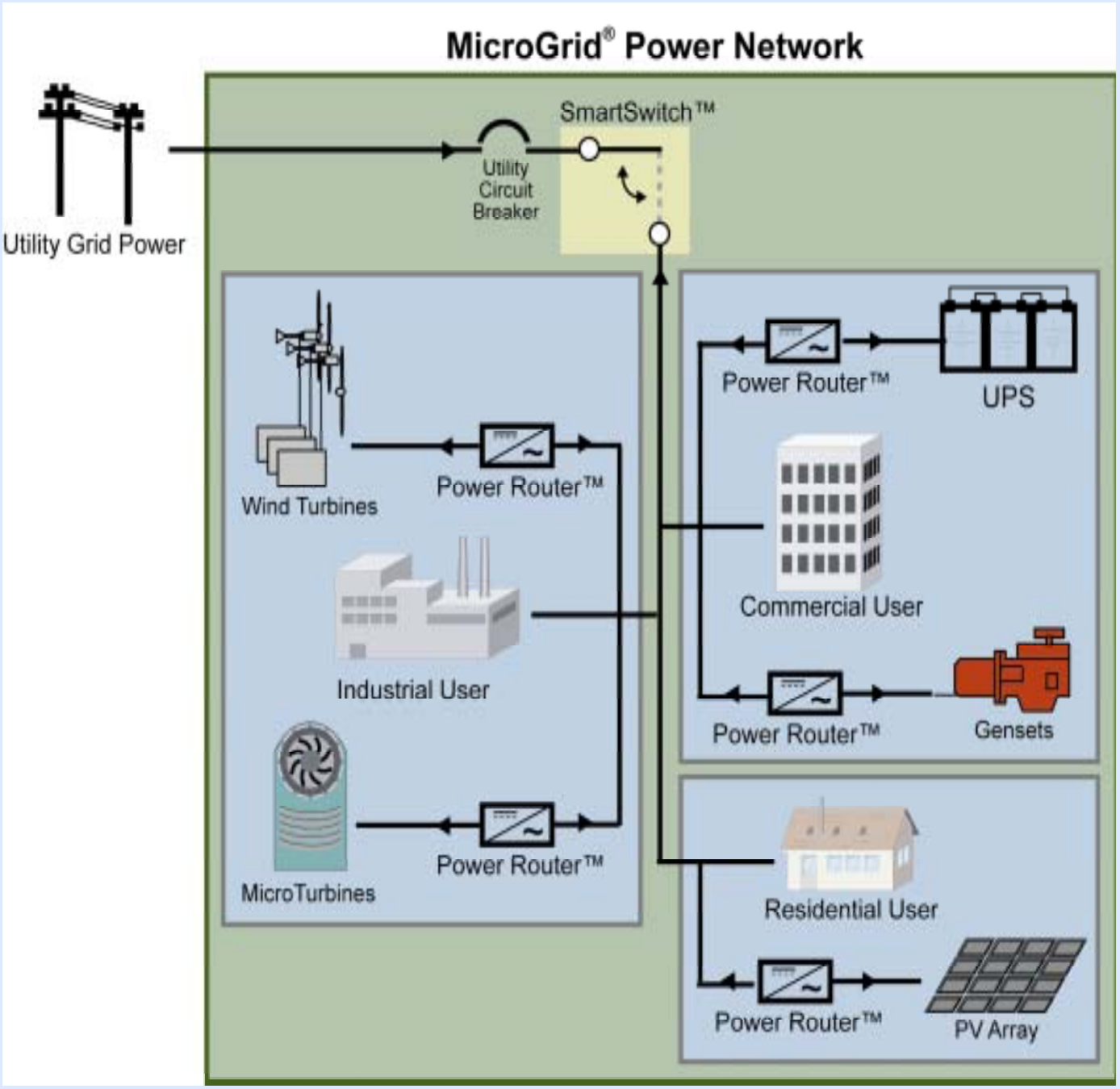


Direct Drive/Power Electronics

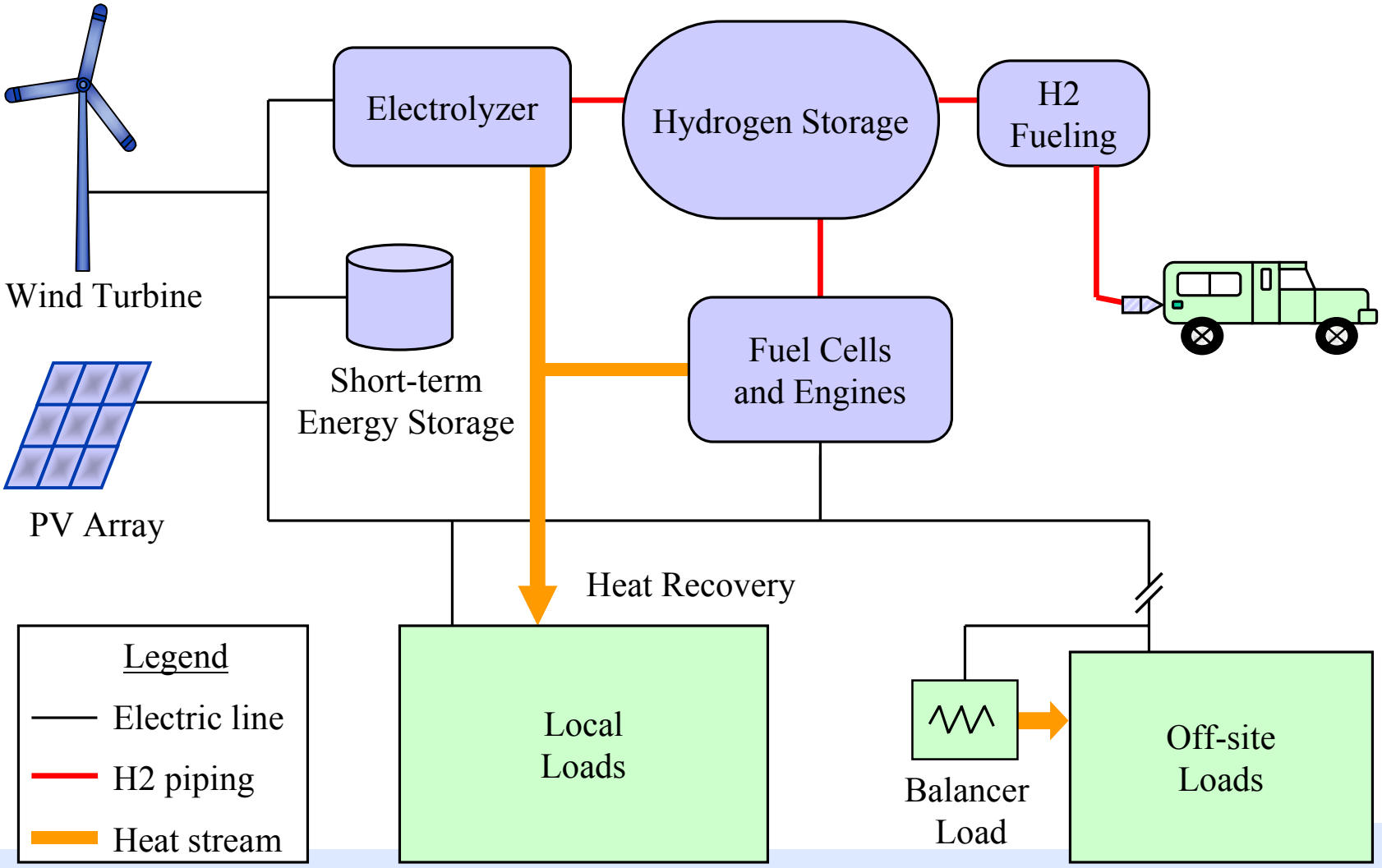


Northern Power Systems
1.5 MW

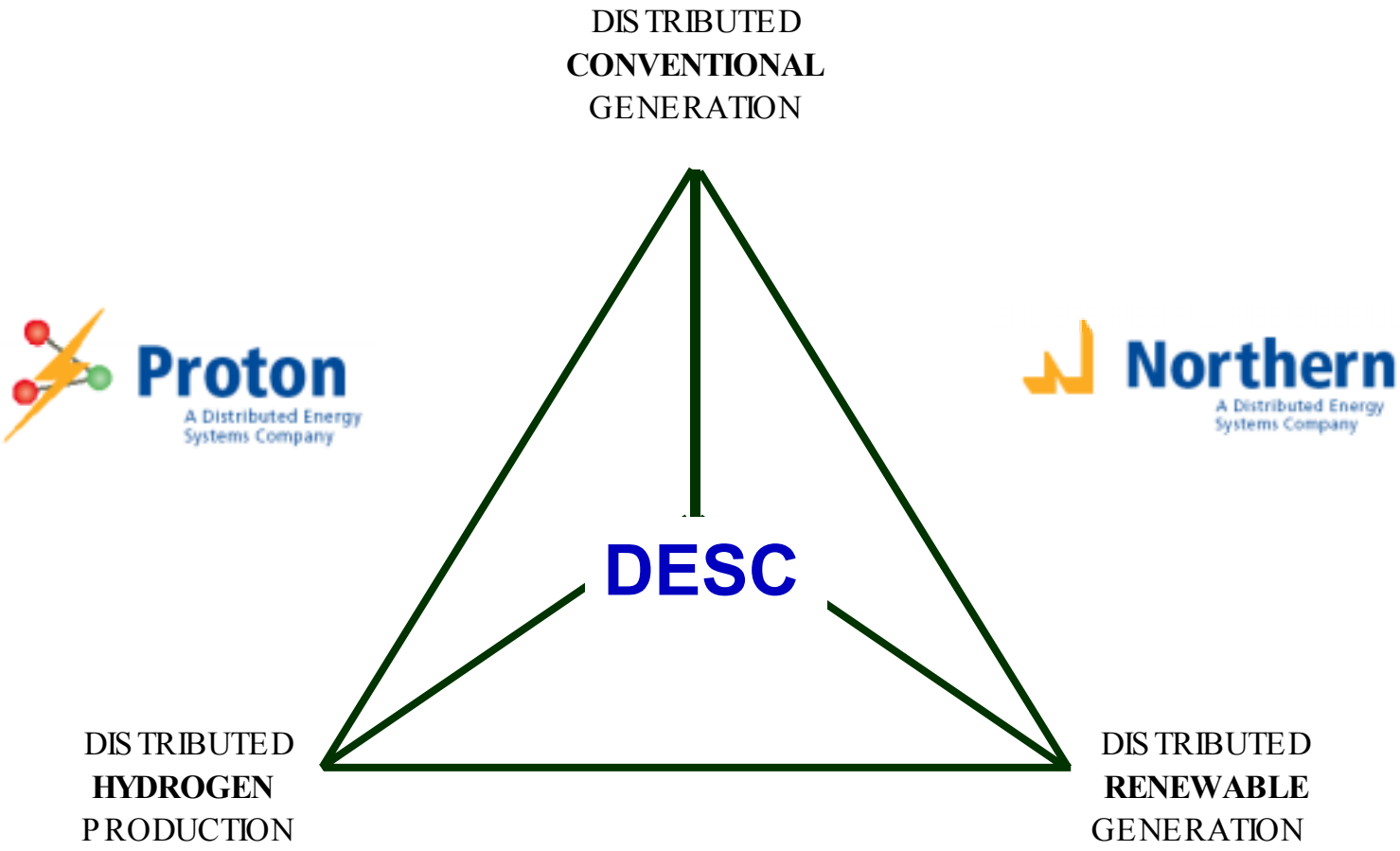



MicroGrid® Power Network
Utility Grid Power
Utility Circuit Breaker
SmartSwitch™
Wind Turbines
Power Router™
Industrial User
MicroTurbines
Power Router™
Power Router™
UPS
Commercial User
Power Router™
Gensets
Residential User
Power Router™
PV Array

Renewable H2 Energy System



Our Vision


DISTRIBUTED
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RENEWABLE
GENERATION

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